



TITLE:

# BRYOZOA OF KII PENINSULA

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# BRYOZOA OF KII PENINSULA<sup>1) 2) 3)</sup>

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*With Plate XII and 19 Text-figures*

Last summer I had a chance to make a small collection of Bryozoa at Sugashima, Nakiri, Hamajima and Shirahama on the eastern and western coasts of Kii Peninsula. And moreover, during my stay at the Seto Marine Biological Laboratory, Dr. H. UTINOMI and Dr. T. TOKIOKA very generously placed the valuable collection of these animals in the Laboratory at my disposal and more courteously submitted a kind offer to publish my results.

I have made, on this opportunity, re-examination of many specimens on which my 1938 report is based, together with other materials obtained along the coast of the peninsula. Field notes and unpublished manuscripts are also re-examined thoroughly. And I have found 92 genera and 152 species and varieties listed up in the following table, of which 5 species and varieties seem to be new to science.

Table 1. List of species collected at the localities.

(Those with asterisks were described by SAKAKURA (1935) and not seen in materials at hand, and those in roman type are commented upon in detail in the systematic account.

Name of Species	Wakayama Pref.						Mie Pref.		
	Kada	off Wakayama	off Minabe	Tanabe	Shirahama	Tonda	Kushimoto	Hamajima	Nakiri
ENTOPROCTA									
<i>Barentsia discreta</i> (BUSK)	+		+		+		+	+	+
<i>Pedicellina cernua</i> (PALLAS)			+		+			+	
<i>Loxosoma</i> sp.					+				

- 1) Contributions from the Seto Marine Biological Laboratory, No. 186.
- 2) Contributions from the Research Institute for Natural Resources, No. 547.
- 3) Studies on the Bryozoan Fauna of Japan and Adjacent Waters. No. 1.

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Name of Species	Wakayama Pref.							Mie Pref.		
	Kada	off Wakayama	off Minabe	Tanabe	Shirahama	Tonda	Kushimoto	Hamajima	Nakiri	Sugashima
ECTOPROCTA										
Cyclostomata										
<i>Crisia elongata</i> MILNE-EDWARDS	+	+				+	+		+	
<i>Crisia eburneo-denticulata</i> BUSK	+			+		+	+	+		
<i>Crisia cuneata</i> MAPLESTONE								+		
<i>Proboscina dichotoma</i> (D'ORBIGNY)			+					+		
<i>Entalophora proboscidea</i> (MILNE-EDWARDS)		+								
<i>Crisulipora occidentalis</i> ROBERTSON			+					+		
<i>Crisulipora iijimai</i> OKADA		+								
<i>Idmidronea atlantica</i> (JOHNSTON)		+			+					
<i>Tubulipora pacifica</i> ROBERTSON				+	+	+		+		
<i>Tubulipora pulchra</i> MACGILLIVRAY					+	+	+		+	
<i>Tubulipora pulcherrima</i> (KIRKPATRICK)			+					+		
<i>Lichenopora radiata</i> (AUDOUIN)		+	+	+	+		+	+	+	+
<i>Lichenopora imperialis</i> ORTMANN					+			+		
<i>Lichenopora buski</i> HARMER								+		
<i>Lichenopora novae zelandiae</i> (BUSK)							+	+		
Ctenostomata										
<i>Anathia distans</i> BUSK	+	+	+		+	+				
<i>Bowrbankia gracilis</i> LEIDY			+					+		
<i>Vesicularia papuensis</i> BUSK							+	+		
<i>Valkeria uva</i> (LINNAEUS)			+		+	+		+		
<i>Zoobotryon pellucidum</i> EHRENBERG								+		
Cheilostomata Anasca										
<i>Aetea anguina</i> (LINNAEUS)		+		+	+	+	+	+	+	+
<i>Aetea truncata</i> (LANDSBOROUGH)				+						
<i>Membranipora tuberculata</i> (BOSC)				+	+	+		+		+
<i>Conopeum reticulum</i> (LINNAEUS)					+				+	
<i>Acanthodesia savartii</i> (AUDOUIN)		+		+	+	+	+	+	+	
<i>Acanthodesia serrata</i> (HINCKS)							+			
<i>Cupulabria guineensis</i> (BUSK)			+						+	
<i>Electra tenella</i> (HINCKS)					+		+	+		+
<i>Antropora granulifera</i> (HINCKS)			+							
<i>Aplousina filum</i> (JULIEN)	+									
<i>Crassimarginatella leucocypha</i> MARCUS			+	+		+		+		
<i>Cr. crassimarginata</i> var. <i>japonica</i> (ORTMANN)	+	+	+	+	+	+				

Name of Species	Wakayama Pref.							Mie Pref.		
	Kada	off Wakayama	off Minabe	Tanabe	Shirahama	Tonda	Kushimoto	Hamajima	Nakiri	Sugashima
<i>Tegella crenulata</i> (OKADA)	+	+	+	+	+	+		+		
<i>Tegella incrustata</i> SILÉN							+			
<i>Callopora tenuirostris</i> WATERS					+			+		
<i>Callopora canui</i> S LÉN			+		+		+	+		
<i>Ellisina albida</i> (HINCKS)				+						
<i>Ellisina canui</i> (SAKAKURA)		+	+		+	+			+	
<i>Parellisina curvirostris</i> (HINCKS)					+		+			
<i>Copidozoum planum</i> (HINCKS)			+							
<i>Hiantopora intermedia</i> (KIRKPATRICK)		+								
<i>Pyrulella corbula</i> (HINCKS)								+		
<i>Exechonella magna</i> (MACGILLIVRAY)					+			+		
<i>Flustra stolonifera</i> (OKADA)				+						
<i>Flustra papyracea</i> ELLIS and SOLANDER			+							
<i>Terminoflustra sagamiensis</i> (OKADA)				+						
<i>Spiralaria serrata</i> (MACGILLIVRAY)					+		+	+		
<i>Steganoporella magnilabris</i> (BUSK)		+	+							
* <i>Labioporella elegans</i> (SAKAKURA)	(off Kii Peninsula)									
<i>Labioporella rhomboidalis</i> sp. n.				+	+			+		
<i>Thalamoporella rozieri</i> (AUDOUIN)		+	+							
<i>Thalamoporella lioticha</i> (ORTMANN)		+	+							
* <i>Roselliana sibatai</i> SAKAKURA	(off Kii Peninsula)									
<i>Micropora coriacea</i> ESPER			+		+			+		
<i>Monoporella nodulifera</i> (HINCKS)				+						
<i>Cellaria punctata</i> (BUSK)	+	+		+						
<i>Tricellaria occidentalis</i> (TRASK)		+	+		+			+		+
<i>Amastigia rudis</i> (BUSK)					+			+		
<i>Notoplites aviculariae</i> (YANAGI and OKADA)		+	+				+			
<i>Caberea darwinii</i> BUSK		+					+			
<i>Caberea hataii</i> OKADA			+							
<i>Caberea lata</i> BUSK	+		+		+	+	+			
<i>Caberea boryi</i> (AUDOUIN)		+								
<i>Scrupocellaria delilii</i> (AUDOUIN)		+								
<i>Ser. diadema</i> BUSK	+	+	+			+				
<i>Ser. maderensis</i> BUSK	+	+	+							
<i>Ser. californica</i> TRASK	+				+	+		+		
<i>Canda retiformis</i> POURTALES							+			
<i>Flabellaris patelliiformis</i> (BUSK)	+	+								

Name of Species	Wakayama Pref.							Mie Pref.		
	Kada	off Wakayama	off Minabe	Tanabe	Shirahama	Tonda	Kushimoto	Hamajima	Nakiri	Sugashima
<i>Synnotum aegyptiacum</i> (AUDOUIN)							+			
<i>Beania magellanica</i> (BUSK)			+							
<i>Beania hexaceras</i> (ORTMANN)	+	+								
<i>Beania octaceras</i> OKADA and MAWATARI	+									
<i>Beania cupulariensis</i> OSBURN				+	+					
<i>Beania discodermiae</i> (ORTMANN)					+	+		+		+
<i>Beania mirabilis</i> JOHNSTON				+	+		+	+	+	
<i>Beania regularis</i> THORNELY					+			+		
<i>Beania intermedia</i> var. <i>kiiensis</i> n. var.					+					
<i>Dendrobeania birostrata</i> (YANAGI and OKADA)			+							
<i>Bugula dentata</i> (LAMOUROUX)				+	+		+			
<i>Bugula vectifera</i> HARMER	+	+								
<i>Bugula subglobosa</i> HARMER			+		+			+		+
<i>Bugula neritina</i> (LINNAEUS)		+		+	+					
<i>Bugula</i> sp.	+	+		+	+			+		
<i>Bugula californica</i> ROBERTSON		+								
<i>Bugula pugeti</i> var. <i>umbelliformis</i> YANAGI and OKADA		+					+			
<i>Caulibugula ciliata</i> ROBERTSON							+			
<i>Halophila johnstoniae</i> GRAY			+							
<i>Colletoria radiata</i> (MOLL)					+			+		+
Cheilostoma Ascophora										
<i>Hippothoa hyalina</i> (LINNAEUS)	+				+	+	+	+	+	+
<i>Trypostega venusta</i> (NORMAN)					+					
<i>Hippothoa divaricata</i> LAMOUROUX			+					+		
<i>Chorizopora brongniartii</i> (AUDOUIN)					+		+	+		
<i>Petralia japonica</i> (BUSK)	+	+	+		+					
<i>Petraliella armata</i> var. <i>microaviculata</i> OKADA and MAWATARI		+					+			
<i>Galeopsis pupa</i> JULLIEN			+							
<i>Schizoporella unicornis</i> (JOHNSTON)				+	+	+	+			
<i>Sch. horsti</i> (OSBURN)					+					+
<i>Sch. nivea</i> BUSK					+		+	+		
<i>Sch. kiiensis</i> OKADA & MAWATARI			+		+		+			
<i>Schizomavella auriculata</i> (HASSAL)			+				+			
<i>Sch. galeata</i> (BUSK)		+								
<i>Arthropoma cecilii</i> (AUDOUIN)			+	+	+	+	+	+		
<i>Microporella ciliata</i> (PALLAS)		+		+	+		+	+		

Name of Species	Wakayama Pref.						Mie Pref.			
	Kada	off Wakayama	off Minabe	Tanabe	Shirahama	Tonda	Kushimoto	Hamajima	Nakiri	Sugashima
<i>Fenestrulina malusii</i> (AUDOUIN)					+	+	+	+	+	+
<i>Hippodiplosia pertusa</i> (ESPER)							+			
<i>Hippodiplosia pallariana</i> (MOLL.)			+							
<i>Hippoporina porcellana</i> (BUSK)		+								
<i>Eurystemella bilabiata</i> (HINCKS)						+		+	+	
<i>Erochella areolata</i> OKADA and MAWATARI	+						+			+
<i>Erochella longirosiris</i> JULLIEN					+	+				
<i>Codonella acuta</i> (ORTMANN)	+				+		+			
<i>Cod. spatulata</i> OKADA and MAWATARI					+	+				
<i>Codonella obusata</i> (ORTMANN)		+								
<i>Smittina trispinosa</i> (JOHNSTON)	+				+					
<i>Sm. trispinosa nitida</i> (VERRILL)		+		+	+			+		
<i>Sm. trispinosa munita</i> (HINCKS)			+		+			+		
<i>Sm. aviculata</i> n. sp.					+					
<i>Sm. triangularis</i> n. sp.					+					
<i>Sm. reticulata</i> (MACGILLIVRAY)							+			
<i>Sm. collifera</i> (ROBERTSON)	+				+	+		+		+
<i>Sm. marmorea</i> (HINCKS)							+			
<i>Sm. perforata</i> OKADA							+			
<i>Sm. bella</i> (BUSK)	+	+		+	+		+	+	+	+
<i>Escharoides sauloglossa</i> LEVINSEN			+				+			
<i>Mucronella perforata</i> OKADA		+								
<i>Mucronella takatsukii</i> OKADA		+						+		
<i>Tubucellaria cereoides</i> ELLIS and SOLANDER	+	+	+							
<i>Iodictyum axillare</i> (ORTMANN)						+				
<i>Iodictyum watanabei</i> (OKADA)	+									
<i>Sertella granulata</i> HARMER						+				
<i>Reteporella graeffei</i> KIRCHENPAUER			+							
<i>Reteporellina denticulata</i> (BUSK)		+			+					
<i>Triphyllozoon bimunitum</i> (ORTMANN)		+								
<i>Triphyllozoon umbonatum</i> (BUCHNER)			+							
<i>Adeona japonica</i> (ORTMANN)	+	+	+		+					
<i>Adeonellopsis hexangularis</i> OKADA)		+	+							
<i>Mastigophora pez-ancris</i> (SCOTT)							+	+		
<i>Hippopodina feegensis</i> (BUSK)			+	+						
<i>Watersipora cucullata</i> watersi MAWATARI	+			+	+	+	+	+	+	+

Name of Species	Wakayama Pref.						Mie Pref.			
	Kada	off Wakayama	off Minabe	Tanabe	Shirahama	Tonda	Kushimoto	Hamajima	Nakiri	Sugashima
<i>Costazia radiata</i> ORTMANN		+					+	+	+	+
<i>Costazia costazii</i> (AUDOUIN)			+	+	+	+	+	+	+	+
<i>Cellepora trirostrata</i> OKADA and MAWATARI					+					
<i>Holoporella tridenticulata</i> (BUSK)							+			
<i>Flabellopora transversa</i> CANU and BASSLER			Kii Peninsula)							
<i>Vittaticella elegans</i> (BUSK)	+	+								
<i>Halysis iijimai</i> (OKADA)			+		+			+		
<i>Myriozoum superficiale</i> ORTMANN	+	+	+							
<i>Myriozoum serratum</i> n. sp.		+	+							

	genera	species and varieties
Entoprocta	3	3
Cyclostomata	7	15
Ctenostomata	4	5
Cheilostomata Anasca	41	69
Cheilostomata Ascophora	37	60
Total	92	152

It is my pleasant duty to present here my results of study and to tender my best thanks to Drs. UTINOMI and TOKIOKA for their special kindness.

### *Loxosoma* sp.

A single individual attached to a *Sargassum* leaf was obtained. The foot is a sucking disc without any wing-like expansions, and provided with faint oblique muscles. No foot-gland is observed. These characters indicate the present specimen belongs to the genus *Loxosoma*, but the individual is very young to determine the exact specific name.

### *Valkeria uva* (LINNAEUS

(Fig. 1)

*Sertularia uva* LINNAEUS, 1758, p. 812.

*Valkeria uva* HINCKS, 1880, p. 551; LEVINSEN, 1894, p. 83; KIRKPATRICK, 1890, p. 17;

CALVET, 1902, p. 93; BIDENKAP, 1905, p. 44; WATERS, 1910, p. 250; WATERS, 1914, p. 853.

Zoarium repent, delicate, attaching *Bugula*, *Tricellaria*, *Scrupocellaria* and other cellularine Bryozoa with its narrow stolon. The stolon is divided at intervals into many internodes by diaphragms. The distal end of an internode dilates into a little swelling, producing, on each side a branch composed of

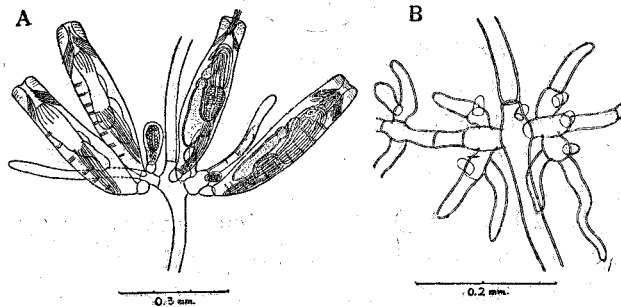


Fig. 1. *Valkiria uva* (Linnaeus) A Several functional zooecia. B A Stolon showing the mode of branching.

short internodes. The short lateral internode gives off again paired lateral branches. Zooecia arising from a vestigial internode, not crowded into a circular group, subcylindrical, more or less attenuated at the base. Orifice terminal, subquadrangular. Vestibule short, pharynx large, and gizzard not observed.

WATERS reported this species from Sudan attaching to *Petralia japonica* which is common in Japanese water, The number of zooecia in a group is rather small (4-7) in Japanese specimens.

#### *Zoobotryon pellucidum* EHRENBERG

A small colony attaching to a raft for the pearl oyster culture is obtained at Hamajima. The name of the present species is found in Miss. ROBERTSON's unpublished list of Japanese Bryozoa based on Dr. Asajiro OKA's collection at Tateyamā, Chiba Prefecture.

I have another complete specimen of this species collected on the bottom of a boat at Misaki, Kanagawa Prefecture which was kindly sent to me by Dr. Katsuma DAN in 1942.

#### *Acanthodesia savartii* (AUDOUIN)

Opesia at first oval, occupying most of the frontal surface; later invaded



by a thickened and somewhat tuberculated cryptocyst in its proximal half. The proximal denticle is variable, sometimes may be merely linear and simple, but more often broad and terminated by fine teeth.

*Electra tenella* (HINCKS)

(Fig. 2)

*Membranipora tenella* HINCKS, 1880, p. 376.

*Electa angulata* LEVINSSEN, 1909, p. 149, 156, 160; HARMER, 1916, p. 207; OKADA and MAWATARI, 1938, p. 449; SAKAKURA, 1938, p. 717.

*Electra tenella* MARCUS, 1937, p. 48-1938, p. 67; OSBURN, 1940, p. 356; SILEN, 1941, p. 18; OSBURN, 1947, p. 10.

Zoarium thin, delicate, brownish in colour, encrusting algae, shells, barnacles, buoys and other floating objects. Zooecia oblong, separated by shallow grooves. Opesium elliptical with a slight proximal cryptocyst. Marginal spines delicate, jointed, varying in number. Operculum with chitinized margin. A pair of strong conical spines or one only, situating on a proximal gymnocyst.

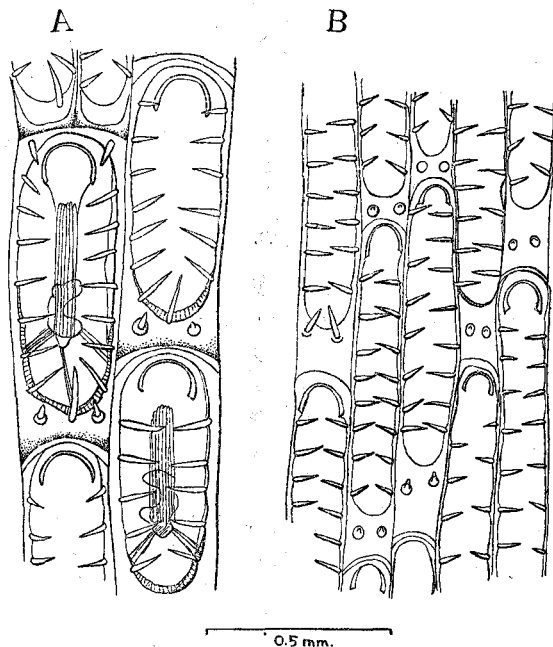


Fig. 2. *Electra tenella* (Hincks) A normal type of zooecia with narrow proximal cryptocyst. B Unusual elongate form.

Avicularia and coecia none.

HINKS figured *Membranipora tenella* as with no marginal spines, and LEVINSEN figured his *Electra angulata* as with six to twelve pairs of them. But in its description, HINKS mentioned that his *M. tenella* is sometimes provided with spines, and LEVINSEN stated that his *E. angulata* is often unarmoured. The two species described as different agree almost completely with each other in all other respects. SILEN wisely treated them as identical.

*Crassimarginatella leucocypha* MARCUS

(Fig. 3)

*Crassimarginatella leucocypha* MARCUS 1937, p. 46.

Zoarium encrusting shells. Zoocia distinct, oval, with salient margin separated by intercalated kenozoecia. Gymnocyst not developed, cryptocyst

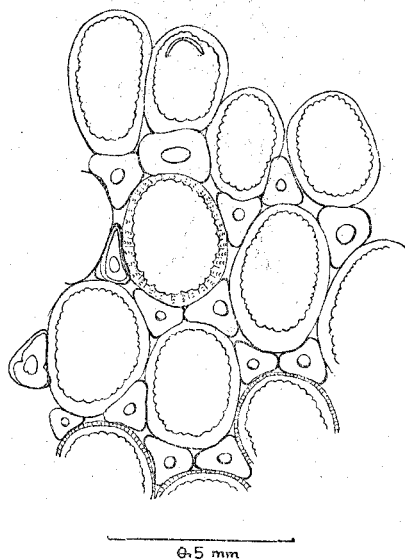


Fig. 3. *Crassimarginatella leucocypha* Marcus

granular with serrated inner margin. Opesia oval, occupying the greater part of the frontal. Kenozoecia of rounded triangle, provided with a median opening, situating on both sides of the distal end of the zoecia. Avicularia vicarious, occupying the position of one of the kenozoecia.

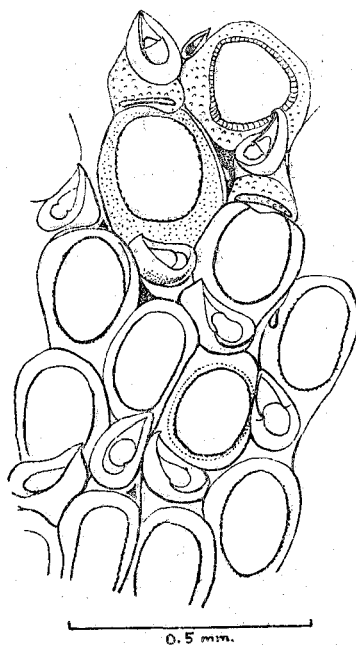
Material at hand is dead without mandibles.

*Callopora canui* SILÉN

(Fig. 4)

*Callopora canui* SILÉN, 1941, p. 34.*Callopora horrida* CANU and BASSLER, 1929, p. 103.

Several zoaria attached to stones and shells are collected. Characteristic narrow transverse fenestra is clear on the tuberculated ooecia. The shape and

Fig. 4. *Callopora canui* Silén

position of avicularium agree with the description and figure of SILÉN. A spine is observed by SILÉN on each distal corner of the zooecia, but it is not detected in the present material.

*Ellisina canui* SAKAKURA

(Fig. 5)

*Membranipora* sp. BUCHNER, 1918, p. 459.*Amphiblestrum canui* SAKAKURA, 1935, p. 6.*Ellisina canui* SILÉN, 1938, p. 273; 1941, p. 37.

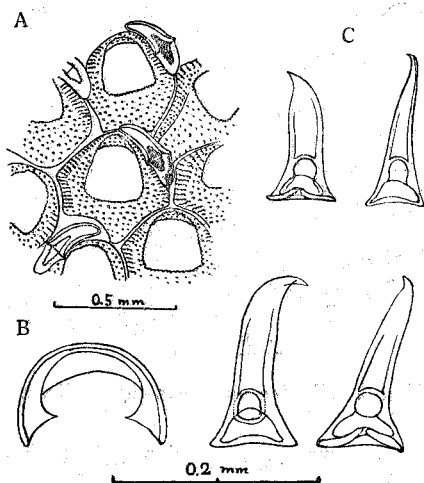


Fig. 5. *Ellisina canui* (Sakakura)  
A Zooecia B Operculum C Mandibles

The materials at hand agree with the description and figures of SAKAKURA. SÉN transferred this species to *Ellisina* on the presence of the vicarious avicularia.

### *Parellisina curvirostris* (HINCKS)

*Membranipora curvirostris* HINCKS, 1880, p. 153; WATERS, 1898, p. 684; ROBERTSON, 1921, p. 46.

*Callopora curvirostris* CANU and BASSLER, 1925, p. 14; 1927, p. 3; 1928, p. 32.

*Ellisina curvirostris* HARMER, 1926, p. 228; HASTINGS, 1930, p. 711; SAKAKURA, 1935, p. 7.

*Parellisina curvirostris* OSBURN, 1940, p. 361; 1949, p. 4.

### *Exechonella magna* (MACGILLIVRAY)

(Fig. 6)

*Hiantopora magna* MACGILLIVRAY, 1895, p. 62.

*Exechonella magna* CANU and BASSLER, 1929, p. 121.

Zoarium encrusting shells and stones. Zooecia large, oval or elliptical, separated by a furrow. Frontal wall much convex, thick and perforated by ten to thirty pores with salient disc-like rims characteristic of the genus. The

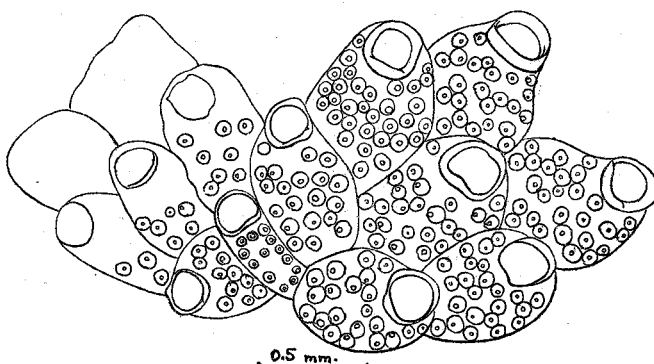


Fig. 6. *Ezechonella magna* (MacGillivray)

structure of the frontal is quite different from that of the usual tremocyst, the true ectocyst being hidden under calcareous layer of the frontal covering. Orifice large, nearly circular or semi-elliptical with convexed proximal margin. Peristome salient and thick. Ancestrula is of the same structure with the normal autozoecium.

The material at hand is a small colony with only 14 zooecia, differing from the Philippine materials in its larger number of pores and also in the absence of avicularia, probably according to its younger condition.

### *Spiralaria serrata* (MACGILLIVRAY)

(Fig. 7)

*Membranipora serrata* MACGILLIVRAY, 1869, p. 131; 1882, p. 3; 1883, p. 105.

*Membranipora acifera* MACGILLIVRAY, 1882, p. 2.

*Membranipora acifera* forma *multispinata* HINCKS, 1882, p. 465.

*Spiralaria serrata* LEVINSSEN, 1909, p. 125; SILÉN, 1941, p. 57.

*Spiralaria spinuligera* OKADA and MAWATARI, 1936, p. 53.

Zoarium encrusting, forming a thin rounded patch of brownish colour on shells. Zooecia elliptical, with large opesia of the same form. Marginal spines pointed, six to eight pairs, extending over the opesia.

Avicularia conspicuous; provided with long curved rostrum extending obliquely distally along a lateral border of the opesia of the succeeding zooecia.

The material at hand agrees well with HINCKS' figure. SILÉN mentioned that *Membranipora acifera* is identical with *M. serrata*. If it be true, the present material is to be identified to *Spiralaria serrata* though it differs from SILÉN's figure in the character of the marginal spines.

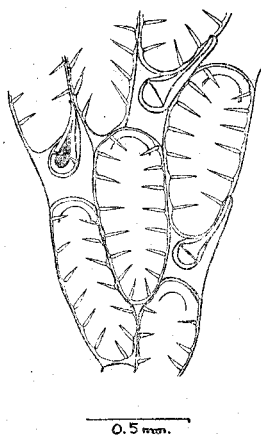


Fig. 7. *Spiralaria serrata* (MacGillivray)

*Labioporella rhomboidalis* sp. nov.

(Fig. 8)

Zoarium encrusting stones. Zooecia elliptical or oblong, with raised edges. Gymnocyst wanting. Frontal membrane transparent, iridescent, separated by

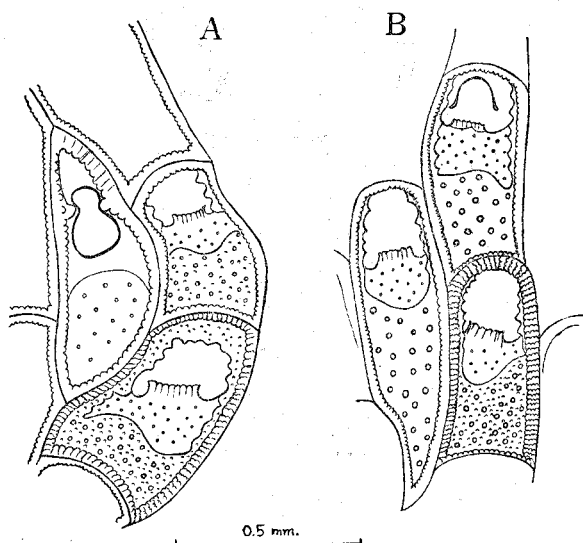


Fig. 8. *Labioporella rhomboidalis* sp. nov.

- A Aviculum and its neighbouring Zooecium.
- B Normal zobecia.

a brownish line. Tube often asymmetrical, lateral recesses distinct. Horizontal cryptocyst developed, porous, granular, occupying about a half of the frontal surface, with a somewhat wide postoral shelf, extending beyond the lateral sides of the orifice, completely round its distal border. Lateral and distal horizontal cryptocyst strongly crenulated in the region of opesia. Postoral shelf smooth, minutely punctate.

Avicularia large, rhomboidal, the proximal portion usually longer than the triangular pointed rostrum.

Avicularian opesia small, pear-shaped extending beyond the lateral condyles, the distal edge smooth, rounded. Rostral floor small, triangular.

The present new species is quite distinct among the known species of the genus in its rhomboidal avicularia.

SAKAKURA described a new species *Labioporella elegans* from Kii Peninsula. No avicularia found in his species, and avicularia rare in my material.

*Micropora coriacea* (JOHNSTON)

(Fig. 9)

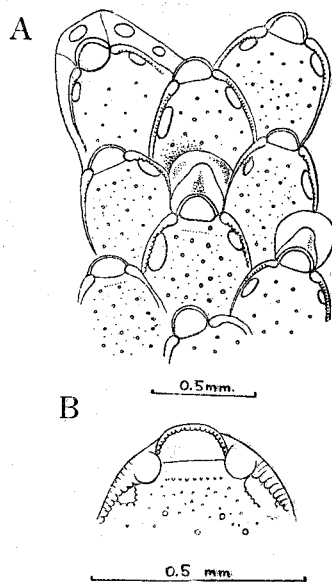


Fig. 9. *Micropora coriacea* (Johnston)

A Zoecia and oecia  
B Orifice and opesiules

*Flustra coriacea* JOHNSTON, 1847, p. 349.

*Membranipora coriacea* BUSK, 1854, p. 57.

*Micropora coriacea* GRAY, 1848, p. 115; SMITT, 1872, p. 13; HINCKS, 1880, p. 147, BUSK: 1884, p. 71; KIRKPATRICK, 1788, p. 75; MACGILLIVRAY, 1887, p. 209; WATERS, 1889, p. 16; WATERS, 1904, p. 39; ROBERTSON, 1908, p. 275; NORMAN, 1809, p. 293; CANU and BASSLER, 1920, p. 235; MARCUS, 1921, p. 101; CIPOLLA, 1921, p. 49; WATERS, 1925, p. 339; 1927, p. 8; O'DONOGHUE 1926, p. 49; HARMER, 1926, p. 307; CANU and BASSLER, 1935, p. 138; OSBURN, 1840, p. 373; OSBURN, 1947, p. 17; MARCUS, 1949, p. 16; OSBURN, 1950, p. 105.

A colony agreeing to the present species is collected off Minabe, encrusting shells. The distal half of the lateral projecting edge finely crenated. A somewhat large conspicuous tubercle on either side of the proximal margin of orifice. Opesiules distinct, asymmetrical with granular edge. Ooecia globose with broad median carina. Operculum very simple, light-coloured.

*Cellaria punctata* (BUSK)

(Fig. 10; Pl. XII, Fig. 6)

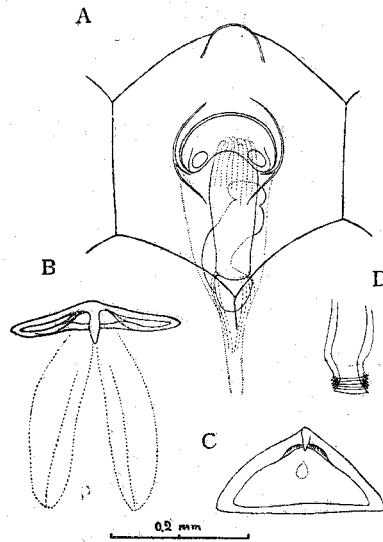


Fig. 10. *Cellaria punctata* (Busk)

- A Decalcified matured zooecium with ooecial valve, operculum, depressor sclerite and Polypide.
- B Mandible with bundles of muscles
- C Mandible
- D End of the connecting tube



*Salicornaria punctata* (pars) BUSK, 1852, p. 366.

*Salicornaria gracilis* BUSK, 1852, p. 17; 1884, p. 93.

*Cellaria gracilis* WATERS, 1887, p. 92; MARCUS, 1922, p. 19.

*Cellaria punctata* HARMER, 1926, p. 387; HASTINGS, 1832, p. 413; MARCUS, 1938, p. 206; SILEN, 1941, p. 70.

*Cellaria triangularis* ORTMANN, 1890, p. 32; OKADA, 1921, p. 30; 1925, p. 225; 1934, p. 11; SAKAKURA, 1935, p. 15; 1935, p. 108; OKADA and MAWATARI, 1935, p. 132; 1938, p. 350.

*Cellaria japonica* CANU and BASSLER, 1929, p. 171.

ORTMANN, in his original description, mentioned that his *C. triangularis* is closely related to *C. gracilis* BUSK (synonymous with *C. punctata*) but differs from it "durch verhältnismässig breitere Felder, durch undeutlich innere Leisten, durch glatten Deckel und durch längere und stärkere Internodien". These differences are insignificant, and re-examination of Japanese materials named *C. triangularis* resulted that they are all identical with *C. punctata*.

### *Scrupocellaria maderensis* BUSK

(Fig. 11)

*Scrupocellaria maderensis* BUSK, 1860, p. 280; 1861 p. 77; HARMER, 1926, p. 372; HASTINGS, 1932, p. 410; SILEN 1941, p. 89.

*Scrupocellaria macandrei* OKADA and MAWATARI, 1938, p. 452.

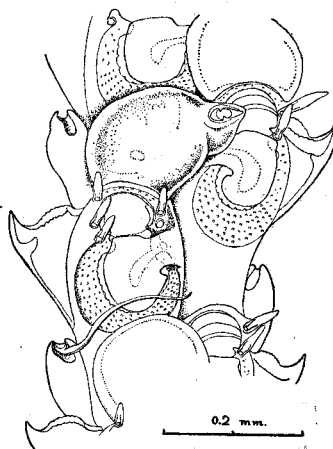


Fig. 11. *Scrupocellaria maderensis* Busk

The present material with strongly granulated cryptocyst is true *Scr macandrei* BUSK, and it is synonymous with *Scr. maderensis* BUSK.

*Beania intermedia* var. *kiiensis* n. var.

(Fig. 12)

The zoarium is uniserial, not reticulate but often forming a dividing thread by the lateral branching of the zooecial series. The zooecia are recumbent, elongate elliptical with truncated distal margin. The proximal end of the zooecium, reaching the median connecting process, of the preceding zooecium is stout and short. The opesia occupy the entire front of the zooecia. No spines are seen on the opesial margin. The operculum is of the usual type without basal sclerite. The avicularia are small, paired, situating at the distal

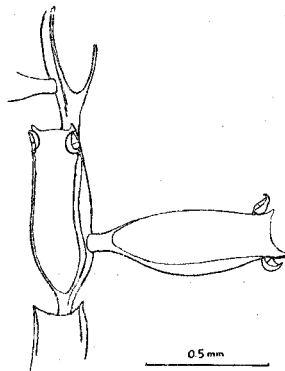


Fig. 12. *Beania intermedia* var.  
*kiiensis* n. var.

corners of the zooecium, each carrying a small triangular mandible. The lateral connecting process is not paired, only one on each side at the level a little distally of the proximal end of the opesium. The ovicells not observed.

The present species is close to *Beania intermedia*, but differs from it in the smaller avicularia without peduncle, the truncate distal border, and smaller number of the lateral connecting processes.

*Bugula* sp. (undetermined)

*Bugula neritina* var. *minima* OKADA and MAWATARI, 1938, p. 451.

HASTINGS stated (1939 p. 336) that "Specimens have also been recorded under this varietal name (*B. neritina* var. *minima* WATERS) by OSBURN, and by OKADA and MAWATARI, but these identifications need confirmation now that the name is more strictly defined".

After re-examination, my specimen was found not belonging to *Bugula minima* thus strictly defined.

Zooecia very small, about half length of those of normal *B. neritina*, and provided with globular avicularia quite different from that of *B. minima*. The proper position of the specimen may be defined when more complete materials obtained.

*Chorizopora brongniartii* (AUDOUIN)

(Pl. XII, Fig. 7)

*Flustra brongniartii* AUDOUIN, 1826, p. 240

*Lepralia brongniartii* BUSK, 1854, p. 65.

*Chorizopora brongniarti* H NCKS, 1880, p. 224; THORNELY, 1907, p. 188; CANU and BASSLER, 1925, p. 23; 1928, p. 29; 1930, p. 14; SAKAKURA, 1935, p. 18.

*Chorizopora ventricosa* CANU and BASSLER, 1929, p. 249.

The zoarium encrusts shells or barnacles, usually forming a thin silvery or grayish crust. The zooecia are delicate, pyriform or ovate separated by reticulated spaces. The frontal is an olocyst, smooth or faintly ringed transversely. Zooecial aperture is semicircular with thin peristome. A small mucro is often observed just below the orifice. The zooecium is hyperstomial, hood-like, smooth or with a median keel, usually provided with a small avicularium on its distal summit. The avicularia are not frontal but vicarious, usually one situating just distally to the normal zooecium.

The most striking feature of this species can be seen in the structure of the peculiar interzooecial networks. In many cases the zooecia seem to be bordered by a single line of small spaces between short connecting tubes, very similar to the structure observed in *Hippothoa hyalina*. Sometimes a rather wide interspace separates the zooecia, filled in by a tubular network and a number of small rounded cells frequently bearing avicularian mandibles. The small cells may be recognized as vestigial zooecia, a peculiar instance of polymorphism in the Bryozoa.

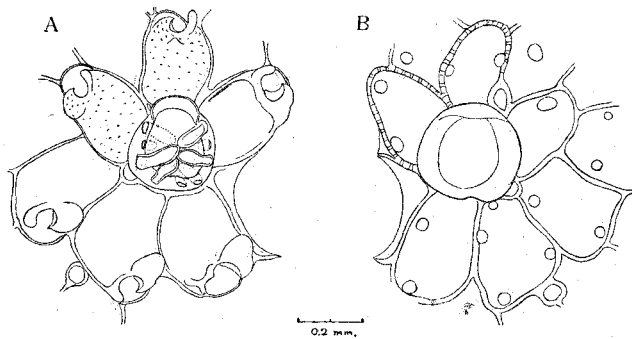
CANU and BASSLER proposed another name *ventricosa* on their Philippine materials, and described "This new species differs from *Ch. brongniartii* in its much wider zooecia with a quite different aspect". Short and wider zooecia are usually seen in many other species encrusting narrow substratum, as its main features correspond to an old species of AUDOUIN, *Ch. ventricosa* may naturally be recognized as a synonym of the present species.

*Schizoporella kiiensis* OKADA and MAWATARI

(Fig. 13)

*Schizoporella kiiensis* OKADA and MAWATARI, 1938, p. 456.

A small colony with ancestrula is newly obtained. The ancestrula is provided with flat deformed spines extending over the opesium and meeting

Fig. 13. *Schizoporella kiiensis* Okada and Mawatari

A Peculiar ancestrula and periancestrular zooecia

B Same dorsal view

at the middle, that reminding me the formation of frontal shield of Cribrillinae by the fusion of costae. Two or three lucidae for attachment are seen on the dorsal side of a zooecium.

*Fenestrulina malusii* (AUDOUIN)

(Fig. 14)

Numerous colonies with ancestrulae are observed. The ancestrula is usually of *Membranipora* type provided with a broad, circular opesium surrounded by ten marginal spines. A single ancestrula is observed in having a normal frontal wall with ascopore, a normal aperture closed by an operculum, and a series of marginal spines of usual type. This may probably be due to the unusual survival of the ancestrular polypide, and not to the total regeneration of zooecium.

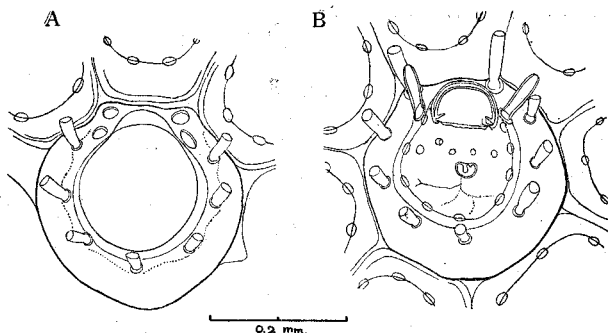


Fig. 14. *Fenestulina malusii* (Audouin)

A Usual type of ancestrula

B Ancestrula with orifice and ascopore.

### *Eurystomella bilabiata* (HINCKS)

*Lepralia bilabiata* HINCKS, 1884, p. 49; ROBERTSON, 1903, p. 298, OKADA, 1929, p. 24.

*Eurystomella bilabiata* LEVINSSEN, 1909, p. 314; CANU and BASSLER, 1923, p. 142; SAKAKURA, 1935, p. 25.

The material at hand differs from that of Mutsu Bay in the absence of a conspicuous tubercle situated just below the aperture. Eurystomellidae was based on a single genus *Eurystomella*, in which included only two species *E. (Lepralia) foraminigera* (HINKS) and *E. (Lepralia) bilabiata* (HINCKS). LEVINSSEN, who established the family and the genus, selected the former as a genotype, and was not certain to include the latter in the same genus. He mentioned that "There may possibly be reason however to form a special genus for the latter". I feel the same hesitation to put the present species in this genus, but the new name may be proposed when some allied species come into our knowledge.

### *Codonella obtusata* (ORTMANN)

*Lepralia obtusata* ORTMANN, 1890, p. 41; OKADA and MAWATARI 1938, p. 457.

### *Smittina aviculata* sp. nov.

(Fig. 15)

Zoarium encrusting or Escharine, uni- or bilameller. Zooecia quadrangular

or hexagonal, rather short, distinct, separated by a salient thread. Frontal is a granular tremocyst provided with marginal areolar pores. Orifice circular with a distinct proximal denticle and a pair of small lateral condyles. Peristome thin, raised laterally into a collar, but usually not raised on the distal end

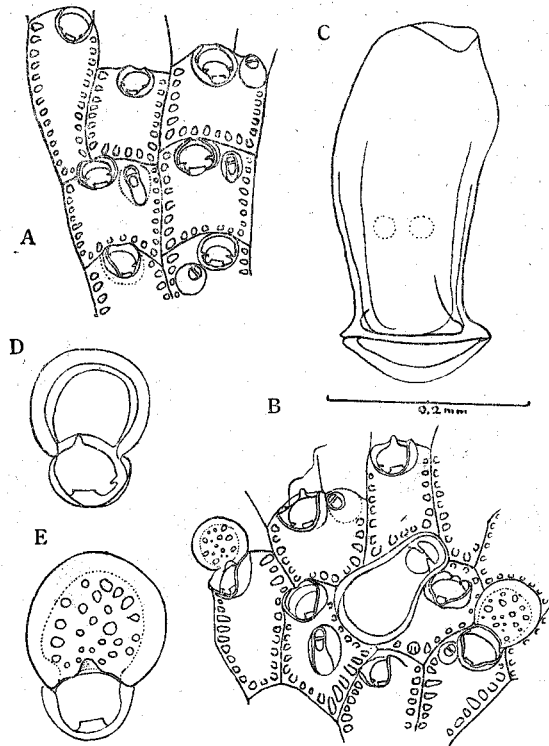


Fig. 15. *Smittina aviculata* n. sp.

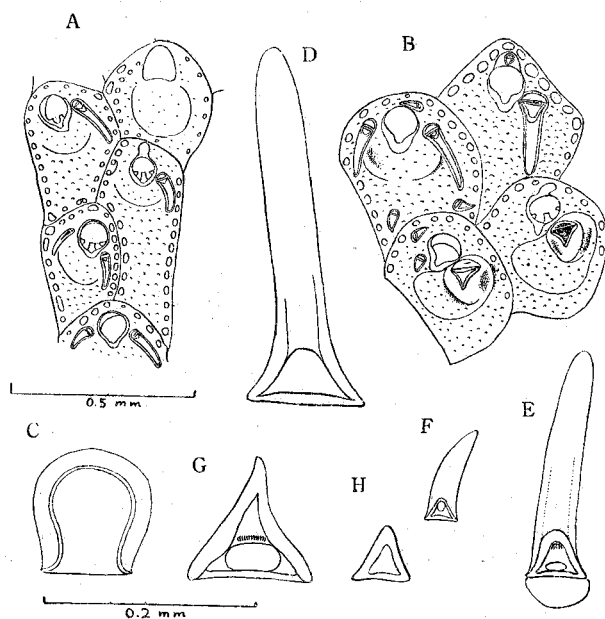
- A Normal zooecia with small semicircular and spatulate avicularia. B Enormous avicularia. C Mandible of the enormous avicularia. D, E Two stages of the development of ooecia.

of the orifice. Avicularia occur in three forms. A small rounded avicularium with semicircular mandible situates on the lateral side of the peristome. An elongated, medium-sized avicularium with spatulated mandible occur proximally or laterally to the orifice. An enormous spatulate avicularium is seen here and there in the colony, the size of which reaches almost as large as a normal zooecium. Ooecia globose with perforated frontal area.

*Smittina triangularis* sp. nov.

(Fig. 16)

Zoarium encrusting. Zooecia distinct, rhomboidal or pentagonal, separated by a thread. Frontal is a granular tremocyst provided with marginal areolae. Orifice circular or of rounded triangle, with a narrow median denticle and two lateral condyles. Peristome salient, rather thin, with a proximal sinus. Avicularia are of four types. The elongated avicularia with peculiar elongated mandible situate one or two on a zooecium, laterally to the orifice directing obliquely backwards. Small avicularia with elongated triangular mandible scattered two or three in the neighbourhood of the orifice or in the proximal part of the zooecium.

Fig. 16. *Smittina triangularis* n. sp.

A Zooecia with elongate avicularia. B.C Operculum D.E Large elongate avicularia F Small elongate mandible G Large triangular mandible.

A small triangular avicularia sometimes occurs near the orifice. Large mucronated pointed ovicularium is observed in many of the zooecia situating latero-proximally to the orifice. The triangular pointed mandible strongly chitinized and yellowish in colour. Operculum semi-elliptical with straight proximal border and submarginal sclerite.

The present species is easily distinguished in having large elongated avicularia and strong triangular avicularia.

*Escharoides sauroglossa* LEVINSEN 1909

(Fig. 17)

*Escharoides sauroglossa* LEVINSEN, 1909, p. 319.

*Smittina foliaceana* OKADA and MAWATARI, 1938, p. 458.

In 1890 ORTMANN described *Smittia adeonelloides* from the Sagami Bay 60-200 fms., and OKADA found it from the Strait of Corea. In 1909 LEVINSEN described *Escharoides sauroglossa* from 33°7'N., 129°20'E. and 33°8'N., 129°20'E.

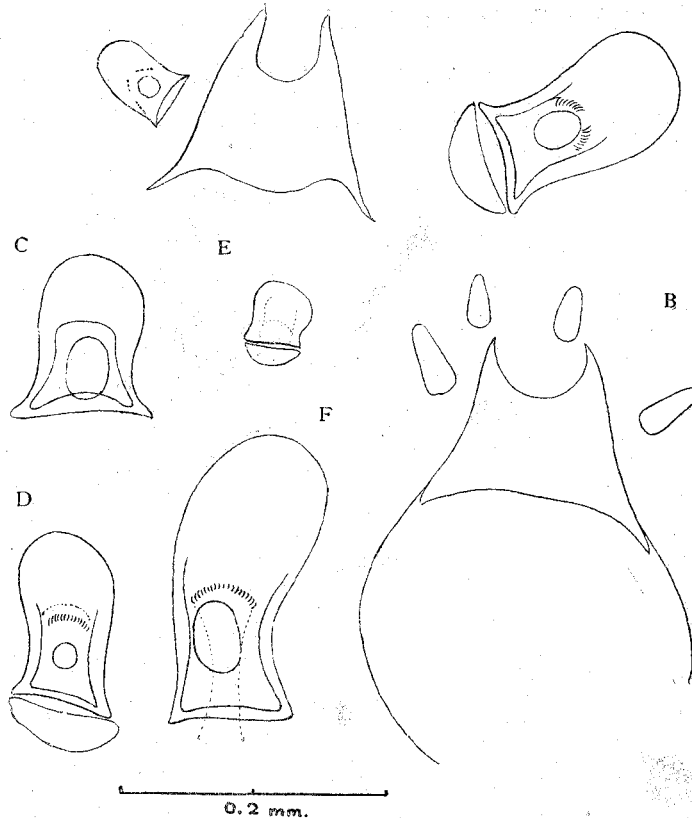


Fig. 17. *Escharoides sauroglossa* Levinsen  
 A Normal position of operculum and mandibles.  
 B Four spine-bases, Operculum and compensatrix  
 C-F Spatulate mandibles



36-40 fms., stations just corresponding to that of OKADA's specimens. SAKAKURA believed that the two species are identical with each other.

*Smittina adeonelloides* is reported as an erect *Adeonella*-type branching colony, and *Escharoides sauroglossa* is described as encrusting unilamellar colony.

I have found the encrusting form occur very commonly in the littoral collection of the various parts of our country, never rising up to form erect colony. The identification to the LEVINSSEN's species is quite certain in the structure of the operculum and avicularian mandibles. The operculum and mandibles of *Smittina adeonelloides* were not figured, but mandibles is said to be pointed, in contrast to the spatulate type of *Escharoides sauroglossa*.

I am now inclined to believe the two species are not identical, and may be allied ones belonging to the same genus *Escharoides*.

### *Tubucellaria cereoides* ELLIS and SOLANDER

(Fig. 18; Pl. XII, Fig. 2)

*Tubucellaria cereoides* WATERS, 1907, p. 129; OSBURN, 1914, p. 203; CANU, 1917, p. 357; CANU and BASSLER, 1928, p. 113.

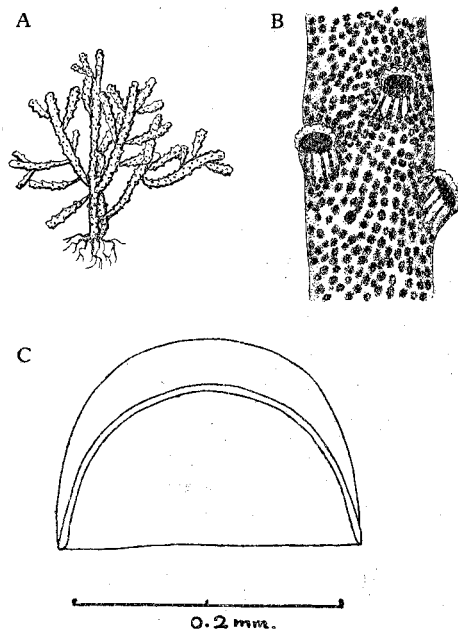


Fig. 18. *Tubucellaria cereoides* Ellis and Solander  
A Articulated zoarium B Zoecia C Operculum

Tubular peristome distinctly curved upwards. Operculum semicircular with submarginal sclerite.

*Adeona japonica* (ORTMANN)

(Pl. XII, Fig. 1)

*Adeonella japonica* ORTMANN, 1890, p. 54; OKADA, 1920, p. 628

*Adeona japonica* CANU and BASSLER, 1927, p. 34.

*Adeonellopsis hexangularis* (OKADA)

*Adeonella hexangularis* OKADA, 1920, p. 34.

*Watersipora cucullata* var. *watersi* MAWATARI

*Lepralia cucullata* BUSK, 1854, p. 81; WATERS 1879, p. 40; 1909, p. 150.

*Schizoporella aterrima* ORTMANN, 1890, p. 49;

*Schizoporella oenochros* (nec. ORTMANN, 1890) OKADA, 1927, p. 1528; 1934, p. 12.

*Dakaria typica* OKADA and MAWATARI, 1937, p. 438; 1938, p. 455.

*Watersipora oenochros* OKADA, 1947, p. 1386.

*Watersipora cucullata* HASTINGS, 1930, p. 729; MARCUS, 1937, p. 118; 1938, p. 46, 110; OSBURN, 1940, p. 449; 1947, p. 40; MAWATARI, 1952, p. 14.

There has been much confusion in the systematic position of this common Bryozoa. Discussions are seen in my recent paper in 1952.

*Halysisis ijimai* (OKADA)

*Brettia ijimai* OKADA, 1921, p. 25; OKADA and MAWATARI, 1935, p. 129.

*Halysisis ijimai* S.LEN, 1941, p. 14.

Several fragments are seen in the present collection. The species has long been known under the name of *Brettia ijimai* OKADA.

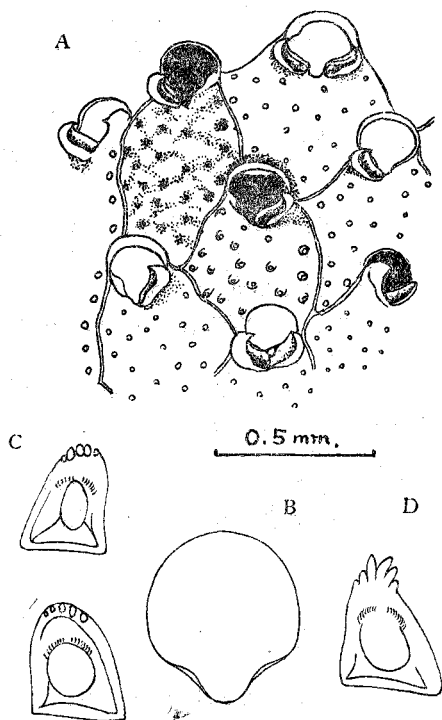
*Myriozoum superficiale* ORTMANN

*Myriozoum superficiale* ORTMANN, 1890, p. 53; OKADA, 1923, p. 231; CANU and BASSLER, 1927, p. 39.

*Myriozoum serratum* sp. nov.

(Fig. 19; Pl. XII, Fig. 8)

Zoarium erect, 2 cm. in height, branching irregularly in all directions. Branches cylindrical, stout, with zooecia disposed quincuncially on all sides. Zooecia distinct, rhomboidal, separated by faintly wavy septal ridges. Frontal thick, flat, punctate. Orifice circular, with a proximal sinus. Peristome not much developed. Oral avicularium, small, a little elevated, situating just on

Fig. 19. *Myriozoum serratum* n. sp.

A Zooecia B Operculum  
C. D Serrated mandibles

the peristome. Mandible small, triangular with minutely serrated distal margin.

This species is closely related to *Myriozoum pulchrum* ORTMANN especially in its position of avicularia, but differs in the peculiar serrated mandibles. WATERS treated *M. pulchrum* as a synonym of *M. subgracile* D'ORIBIGNY, but I feel much hesitation to accept his determination.

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## EXPLANATION OF PLATE XII

- Fig. 1. *Adeona japonica* (ORTMANN).
- Fig. 2. *Tubucellaria cereoides* ELLIS and SOLANDER.
- Fig. 3. *Petralia japonica* (BUSK).
- Fig. 4. *Schizoporella unicornis* (JOHNSTONE).
- Fig. 5. *Smittina reticulata* (MACGILLIVRAY).
- Fig. 6. *Cellaria punctata* (BUSK).
- Fig. 7. *Chorizopora brongniartii* (AUDOUIN).
- Fig. 8. *Myriozoum serratum* n. sp.
- Fig. 9. *Conopeum reticulum* (LINNAEUS).
- Fig. 10. *Arthropoma cecilii* (AUDOUIN).
- Fig. 11. *Schizoporella nivea* BUSK.
- Fig. 12. *Microporella ciliata* (PALLAS).

